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ABSTRACT

The CAUT (College and University Teaching) Project, was designed to create activities to enable faculty members at Oregon State University to design and implement a systematic instructional process. The CAUT Project uses a full year program with four phases of inservice activities for faculty members: workshops, a planning period, a materials and teaching strategies development period, and a one-or two-day evaluation. As a result of the CAUT project a teaching/learning experience in a business course in data processing was developed which used competency-based testing as a beginning step in developing self-paced instruction. This method stimulated improved student satisfaction and higher average grades. In addition, the average level of student competency increased, the proportion of students completing the course increased, and student evaluation of the teaching effort was higher. (CH)

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IMPROVING UNDERGRADUATE TEACHING THROUGH A FACULTY DEVELOPMENT PROGRAM

(Oregon State University is encouraging innovative appraoches to instruction. The College and University Teaching (CAUT) Project has been launched to encourage faculty to explore new teaching techniques. The article, "FACULTY DEVELOPMENT IN HIGHER EDUCATION: OREGON STATE UNIVERSITY'S COLLEGE AND UNIVERSITY TEACHING (CAUT) PROJECT" by Dean N. Osterman and Ben P. Purvis describes the organization and function of OSU's program to improve instruction at the undergraduate level. The second article, "A TEACHING WORKSHOP APPROACH TO FACULTY DEVELOPMENT: SOME EMPIRICAL RESULTS" by William L. Harrison provides the impact of the CAUT Project on his course improvement.)

"FACULTY DEVELOPMENT IN HIGHER EDUCATION: OREGON STATE UNIVERSITY'S COLLEGE AND UNIVERSITY TEACHING (CAUT) PROJECT"

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"A TEACHING WORKSHOP APPROACH TO FACULTY DEVELOPMENT: SOME EMPIRICAL RESULTS"

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FACULTY DEVELOPMENT IN HIGHER EDUCATION: OREGON STATE UNIVERSITY'S COLLEGE AND UNIVERSITY TEACHING (CAUT) PROJECT

Dr. Dean N. Osterman, Oregon State University
Dr. Ben P. Purvis, Oregon State University

Creating an atmosphere for motivating and stimulating university professors toward teaching effectiveness when most of the rewards are given for research is one of the most significant areas of concern in higher education.[1] One approach used to foster such an atmosphere is that of establishing programs for faculty in instructional methodology and media awareness. At first faculty members are suspicious and resistant to faculty development programs.[2] Consequently, the task of keeping such programs alive and successfully operating is difficult if not impossible in a time of faculty entrenchment. With this bleak introduction, one may ask the question: How effective are faculty development programs at the college and university level as an aid in improving teaching effectiveness? The question deserves careful consideration; however, the answer may remain unknown until an adequate definition of a faculty development program is formulated and evaluated. The following description of the College and University Teaching (CAUT) Project at Oregon State University may be viewed as one example of a faculty development program. In terms of its effectiveness for improving teaching at the university level, a report by Dr. William L. Harrison is included.

During the last six years at Oregon State University a strong interest has been demonstrated by many instructors in improving the teaching/learning process with more teaching effectiveness. With the essentials of media and available commercial instructional programs, the right atmosphere for fostering more effective instructional systems may develop. Unfortunately, not all faculty have had the exposure to the appropriate use of available instructional services or even know where to start in the process of instructional development. Frequently, instructors who enthusiastically use a new approach or technology become discouraged because they may have chosen the wrong approach. Perhaps a great expense was involved or the instructor lacked proper consultation with specialists who could have evaluated the new approach or provided an understanding of the fundamental aspects of instructional planning to the instructor. With these types of experiences, the instructors are unaware of the research which supports new trends and strategies; thus the college or university student (the learner) is faced with insufficient and less flexible learning procedures.

To break the tradition of models perpetuating "like" models, the university must use faculty development programs that yield competent students and graduates. In addition, the university must move to a viewpoint that the quality of the university's teaching is best measured by those competencies it generates in its learners. It is of no value to require a given level or kind of performance from faculty if there is a

general lack of understanding of how to produce competencies in students or proof that it has been achieved. Comprehensive and readily accessible human and material resources must be available for faculty to assist them in creating teaching technologies to solve these problems. These resources help by providing the knowledge necessary to aid faculty in using a variety of measurement and feedback procedures and making alterations in teaching behavior.

Recognizing the problems associated with instructional development processes, the College and University Teaching (CAUT) Project at Oregon State University was created (1974) through the Office of Undergraduate Studies under the leadership of Dean Stuart E. Knapp to meet and cope with these problems. The CAUT Project is designed to create activities which will enable faculty to design and implement a systematic instructional process. These activities include teaching selected faculty innovative approaches to instructional development with emphasis upon establishing curriculum models which allow for independent learning processes, competency-based education, and other instructional forms which allow for increased instructor-student involvement.

Rather than a two or three day "all-encompassing" workshop, the CAUT Project uses a full-year with four distinct phases that provide instructional activities. Interpersonal communications methods inform faculty about instructional innovations and technology. The instructional consultants are selected on their abilities to orally communicate with faculty on an interpersonal basis. This process is emphasized throughout the four phases over other informational diffusion methods as a result of recent research on informing faculty.[3] The four phases of the CAUT Project are as follows:

Phase I (workshop session) consists of three weeks of daily sessions directed by five instructional consultants plus the CAUT staff. Dr. Jerrold E. Kemp, Coordinator of Instructional Development at San Jose State University, will expose the participants to Instructional Design, Selection and Evaluation of Media and Methods, and Evaluation of Instruction. Dr. Ronald J. McBeath, Director of the Instructional Resources Center at San Jose State University, will join Kemp in a seminar and demonstration of learning theories and conditions of learning. Dr. Samuel N. Postlethwait of Purdue University will present "Audio-Tutorial Approach to Learning." Dr. Charles E. Wales, Director of Freshman Engineering at West Virginia University, will conduct his workshop in the "Guided Design Approach to Teaching and Learning." Dr. Carol Saslow, Associate Professor of Psychology at Oregon State University and a former CAUT participant, will conduct learning activities in Personalized System of Instruction (PSI). Participants will be exposed to several different teaching/learning approaches, and the CAUT Project staff will help participants evaluate and select the method that most enhances the instructor's performance.

During the workshop period, participants will be expected to develop representative plans for units and courses with the assistance of the instructional consultants and the CAUT Project staff.

Phase II (two-month planning period) will be used to design a comprehensive plan of instruction with the assistance of the CAUT Project personnel and campus resource departments. The instructional planning as developed in Phase I will be incorporated into a more complete and defined instructional design during Phase II. The emphasis will be on organizing and designing specific objectives, teaching strategies, and evaluation

procedures -- rather than on materials development. The four out-of-state consultants do not participate after Phase I, but instead, this supportive help is provided by CAUT Project staff at OSU.

Phase III (materials and teaching strategies development period) will provide each participant with consultation and aid in developing instructional materials and methods consistent with the plans and learning activities of Phases I and II.

Phase IV (one or two-day evaluation period) will be used as colloquium to describe and report the participant's output through Phases I-III. Each participant will prepare a report of the instructional design, objectives and evaluation, materials developed, and plans for future innovations. Once the Project is completed, the CAUT staff will continue to be available for assistance. Participants will be expected to determine changes in students' learning and attitudes as a result of the Project's input to the instructor.

One of the fundamental problems faced by any program designed to improve university teaching is that associated with voluntary involvement by faculty.[1] Even if a proven resource for instructional improvement is available, many faculty feel that merely asking for assistance is in itself an admission of inadequacy or incompetency. Presently, the CAUT Project addresses this problem by involving conscientious faculty who have expressed their need for assistance by applying to and being selected by their departmental curriculum committee and the respective Dean of their school for participation in the Project. Assuming that the CAUT Project will continue to expand, it may be necessary to initiate a new involvement strategy. To this end, it may be desirable to conduct workshops for specific groups such as new faculty, untenured faculty; faculty of a particular academic rank or the entire faculty of a department or school. Because of the relatively high turnover rate of untenured faculty, the benefits derived from participation in the CAUT Project will be spread to other educational institutions.

It is essential that the CAUT Project operates in the broadest possible context by providing informational exchange at three principle levels; (1) participant seminars assure that the various procedures developed and results obtained by each faculty member contribute to the knowledge of all participants; (2) a series of seminars and presentations conducted on a campus-wide basis acquaint additional faculty with the CAUT Project and demonstrate the kinds of gains they can expect through participation in it; (3) a comprehensive annual report distributed campus-wide and submitted for publication in the appropriate professional journals. Also, individual reports written and published by faculty participants (such as the article by Dr. William L. Harrison) promote a wide dissemination of practical information that can be used by other faculty and educational institutions.

As the quality of instruction is improved, it is felt that there will be a commensurate improvement in the efficiency of the learning process and in students' competencies.

In terms of the effectiveness of the CAUT as an aid in improving teaching effectiveness, the past CAUT participants have reported that the Project has been effective. Feedback from students and administrators about the changes in the participants' teaching methods has been supportive. The

far-reaching "spin-offs" or effects of the Project may never be ascertained.

Concrete evidence of changes in students' learning can be viewed in the following report of Dr. William L. Harrison. Dr. Harrison completed his report after participation in the CAUT Project's Phases I and II. This paper describes a change in the teaching/learning approach which resulted from the activities in the faculty development program at Oregon State University.

A TEACHING WORKSHOP APPROACH TO FACULTY DEVELOPMENT: SOME EMPIRICAL RESULTS

Dr. William L. Harrison, Oregon State University

This paper describes a teaching/learning experience during the fall terms of 1974 and 1975 in the School of Business at Oregon State University. The course is called Introduction to Business Data Processing, and the subject matter consists of approximately 40% data processing and 60% programming in the FORTRAN language. The investigation was stimulated by the author's experience in the College and University Teaching Project at Oregon State University. The CAUT Project has been previously described.

Those of us who teach for a living are frequently faced with the problem of improving the efficiency or effectiveness of the process. Unfortunately, the literature of higher education, to this point in time, provides us with very few landmark studies. The preponderance of studies indicate that teaching methodology, for example, is relatively ineffective in bringing about change in the cognitive domain. That is, most studies indicate that students will acquire basically the same amount of knowledge from a course in spite of the type of pedagogy employed by the instructors.[4] It does not seem to make any difference whether the instructor uses lecture, lecture combined with discussion, instructor led discussion, lecture or instructional television, or other combinations as reported in the majority of the findings.

There are areas, however, in which it does seem that differences can be effected. Where the content of the course is acquisition of a set of facts, self-paced or personalized system of instruction seems to be the most effective method.[5,6] (Personalized System of Instruction, PSI, was one of the methods presented in the CAUT Project.) The self-paced course is labor intensive as compared with the lecture or lecture-discussion approach, so it is not entirely clear whether this method is more efficient as well as effective. The efficiency question depends upon the method and type of staffing, the magnitude of the initial investment on the instructor's part, student demand for the course, and other variables.

The other area in which teaching methodology does seem to have an impact is the affective domain, the way students feel about the learning process. There are activities which can be undertaken by the instructor to enhance the level of satisfaction students acquire in completing a particular course.

The author developed a self-paced choice for students as an alternative to the standard lecture approach currently being used. The transition from the normal lecture mode of teaching to that of self-paced instruction requires a tremendous amount of time and effort on the part of the instructor. It seemed to make sense to move first to some intermediate pedagogy. Rather than feature all of the aspects of a self-paced course, it was decided to develop competency-based testing. This particular study focuses on competency-based testing.

Competency-based testing requires that the instructor develop examinations which measure the level of competency of a student in each of several modules which make up the subject matter of the course. Students in some schemes are allowed to progress from one module to another only after having displayed some minimum level of competency on the examination over the previous module. This means that students are to be provided with a sufficient number of versions of modular examinations to demonstrate their competency. The author employed competency-based testing in an introductory business data processing course wherein numerous versions of exams were provided, but one competency on one module was not prerequisite to work on any other modules.

This testing method was used in the author's teaching of three sections of the course during the fall quarter of 1975. The results from this experience are compared with the author's experience in teaching three sections of the same course during the fall quarter of 1974.

Students in the 1974 version of the course were given three midterms plus a final and were allowed to drop one midterm grade from the determination of the course grade. Students in the 1975 version of the course were given five somewhat smaller midterms plus a final and were not allowed to drop any grade from the determination of the course grade.

Letter grades were allocated on the basis of the "curve" in 1974, but exams in 1975 were graded strictly as follows:

Points	Letter Grade
13.50 - 15.00	A
12.00 - 13.49	B
10.50 - 11.99	C
9.00 - 10.49	D
Below 9.00	F

In 1975, students were allowed to take additional examinations over course modules until they achieved the grade level with which they were satisfied, or until the term drew to an end. That option was not available to the 1974 students.

Both classes were given the same, comprehensive final examination with a few minor changes to accommodate a change in the University's computer. Final examinations were not returned to students at the end of the fall term in 1974 and very few students asked to see their finals after that term, or indeed any term, so the presumption is that very little information about the final could find its way from 1974 students to 1975 students. Some possibility does, however, exist that the latter group had better information. They were not, however, given any reason to suspect that they would be given the same final exam. The exam which was given was objective in character, consisting of true/false questions and problems requiring specific numerial

answers.

Results:

The results gleaned from this "experience" are interesting. Comparisons between the two different administrations of the course were made in terms of the proportion of students successfully completing the course, the grades they achieved, the overall level of competence they achieved, and their evaluation of the overall quality of the teaching of the course.

Both quarters were eleven weeks long. Students at Oregon State are allowed to drop a course without responsibility for grades any time during the first six weeks of the term. A course which has been dropped does not appear on the student's transcript. Students are allowed to withdraw from a course with a grade of "W" any time during the seventh, eighth, ninth, and tenth weeks of an eleven-week term. The number of students-enrolled, the number who dropped, and the number who withdrew are listed in Table I.

Table I

	1974	1975
Number enrolled	134	162
Number dropped	26	16
Number withdrew	1	5
Number completed	107	141
Percent completed	79.85	87.03

From these figures we can see that the average class size was larger in 1975 than 1974 (54 vs. 45), and that a slightly larger fraction of students finished the course in 1975 as opposed to 1974. The difference in number of students finishing the course is statistically significant at the 5% level.

Table II provides a look at the allocation of grades for the course. It should be remembered that in 1974 the grades were assigned on an exam by exam basis according to an arbitrary distribution, whereas in 1975 the grading scale was fixed and made public in advance.

Table II

Grades	1974	1975
A grades	12 (11.2%)	45 (31.9%)
B grades	40 (37.4%)	59 (41.8%)
C grades	43 (40.2%)	26 (18.4%)
D grades	8 (7.4%)	8 (5.6%)
F grades	4 (3.7%)	3 (2.1%)

It is clear from Table II that grades allocated for the course are definitely better in 1975. One could account for the difference in the 1974 and 1975 scores in terms of exam-taking. The 1975 group was allowed to retake exams prior to the final. Table III displays the frequency table for student attempts at passing exams.

Table III

Exam \ Version	1	2	3	4	5	6
I	139	42	12	9	1	
II	143	94	91	31	26	19
III	136	68	97	71	34	
IV	124	109	82			
V	131	50				
VI	132					

The total number of exams taken was 1,641 which averages to 11 exams per student. In that there was no opportunity to retake the final, that implies on the average, students took each exam twice. The first exam was easy, and the opportunity to retake exams toward the end of the course was curtailed by time. Otherwise, that statistic would have been higher.

Students in the 1974 course achieved an average grade of 66.30 with a standard deviation of 15.52. Students in the 1975 course achieved an average grade of 73.94 with a standard deviation of 10.80. On the surface it would appear that students acheived a higher level of competence in the 1975 course. Perhaps it is the case that they took so many exams that they became more proficient at exam-taking. Or, perhaps they learned more about the course. Our intuition supports the latter. *

The author, with the assumptions of the statistics, is convinced that the difference in methods was largely responsible for the difference in student-performance.

Yet another area needs some discussion in this area of appararent renewed interest in the teaching effort. The School of Business at Oregon State uses a student questionnaire to provide some information about a faculty members teaching ability. For administrative purposes the following single question is used:

How would you rate the overall quality of the teaching of this course?

4	3	2	1	0
( )	( )	( )	( )	( )

(The scale runs from outstanding (4) to poor (0).)

In 1974, the students average rating of this instructor was 2.65 which put his performance in the fourth quintile as compared with his colleagues. In 1975, this figure was 3.28 which was in the first quintile.

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* Statistics are available from the author to indicate that students performed better on the final exam in 1975 than in 1974. A 95% confidence, significant difference level was ascertained.

Summary and Conclusions:

Self-paced instruction is designed to accommodate students of varying learning speeds, and the instruments of self-paced instruction include competency-based testing. Both are somewhat labor intensive. Most of the professor's labor is expended during the development phase when learning modules are being desinged, auxiliary materials are being developed and numerous versions of exams are being prepared for each learning module. Rather extensive use of student assistant labor is required during the actual administration of the course. The professor's costs are analagous to the sunk costs of investment. It is possible to postpone some portion of the initial investment until some preliminary assessment of returns is achieved through a course using competency-based testing to complement the normal lecture mode.

This paper describes such an approach. In general the results show:

1. The average level of student competency is increased.
2. The proportion of students completing the course is increased.
3. Student satisfaction is increased.
4. The average grade of the course is raised.
5. Student evaluation of the teaching effort is higher.

The results are concluded from the author's initial experience with one course (three sections) taught for one term. The sample is too small and the controls on the environment too inadequate to generalize from these results. However, from this intermediate pedagogy, it is now possible to contemplate the additional costs and benefits to be derived from moving on to a self-paced course. On the other hand, this intermediate pedagogy is not a bad place to remain for awhile.

At first, some sort of program outside of one's environment is necessary to get stimulated and motivated to attempt a new idea in teaching. The College and University Teaching Project provided the spark to try a new approach at bettering both the instructor and students' performance. To this end, the Project was successful; the results that were determined by the author's investigation and the attitudes that were reinforced can support a viewpoint that faculty development programs may be effective.

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